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ABSTRACT

This study examines the relationship between knowledge and attitudes with respect to nuclear issues, including the nuclear freeze proposal, MX missle, and Strategic Defense Initiative. Adults (N=750) drawn from a list of registered voters in Los Angeles County were sent a 53-item questionnaire. Of the respondents, 64 percent were male, 53 percent were married, 68 percent had some college education, 24 percent had graduated from high school only, 82 percent were Caucasian, 41 percent were Republicans, 40 percent were Democrats, and 54 percent had a family income between $20,000 and $50,000. Fourteen items on the questionnaire measured attitudes; 23 items measured knowledge. Knowledge questions included items such as the number of nations with nuclear weapons and if the United States nuclear warning systems have ever malfunctioned. Attitude questions included items such as agreement with a nuclear freeze and with spending money on "Star Wars" research. When controlled for education, income, and age, correlations between knowledge and attitudes revealed that voters with more knowledge were significantly more likely to support a nuclear freeze, oppose building more missiles, and oppose funding "Star Wars" research. Five tables and three pages of references are included. (Author/ABL)

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KNOWLEDGE, ATTITUDES AND BELIEFS REGARDING NUCLEAR "WEAPONS":

A SURVEY OF REGISTERED VOTERS IN LOS ANGELES COUNTY IN 1985

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and

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Abstract

This exploratory study, based on analysis of data generated by mailing a 53-item questionnaire to 750 adults in Los Angeles County, examined the relationship between knowledge, attitudes and beliefs with respect to nuclear issues, including the nuclear freeze proposal, the controversial MX missile, "Star Wars," and the like. The sample was drawn from the County's list of registered voters. Of the respondents, 64% were male, 53% were married, 68% had some college background, 24% only graduated high school, 82% were Caucasian, 41% were Republican, and 40% were Democrats. Fourteen items on the questionnaire assessed attitudes; 23 items measured extent of knowledge. Correlations (controlling for education, income and age) between knowledge and attitudes revealed that voters with more knowledge were significantly more likely to hold an attitudinal position which involved supporting a bilateral and/or unilateral nuclear freeze, opposing building more missiles, and opposing the funding of Star Wars research ($p < .004$).

KEY WORDS: nuclear war; nuclear weapons; nuclear arms race; knowledge and attitudes about nuclear weapons and nuclear war; Strategic Defense Initiative; "Star Wars".

INTRODUCTION

This study focused upon a problem which concerns us all: survival in the nuclear age. With the advent of the stockpiling of vast numbers of nuclear warheads, an important characteristic of such devices changes: they are no longer weapons, insofar as weapons are "instruments of defensive or offensive combat" (Webster's New Collegiate Dictionary, 1977). Multiple nuclear devices are qualitatively different from a single nuclear device, for, if detonated, they would likely destroy the aggressor nation in addition to its victim, due to the consequent nuclear winter and utraviolet spring. (Some theoreticians hypothesize that the smoke and debris lifted into the atmosphere following a nuclear war would engender a nuclear winter, and radioactivity would deplete the ozone layer in the atmosphere; survivors would be bombarded by radioactive fallout and unshielded from the ravages of weather and ultraviolet rays.) Even if the predictions regarding nuclear winter are exaggerated, "the consequences of nuclear war would be horrible enough...for advocates of nuclear arms [reduction or] elimination to make their case" (Cowen, 1986). Intercontinental nuclear war would have such terrible consequences that it should be clear that multiple nuclear devices are not useable as instruments of combat and cannot realistically be termed weapons; they are best conceived of as "human exterminators" rather than weapons (Willens, 1985).

One could take hope in the thought that every responsible human shares this awareness, and nuclear war is therefore an impossibility. Tversky and Kahneman (1974), however, found that people are willing to take

disproportionate risks to try to avoid loss in a crisis. With the deployment of "first-strike" or "counterforce" nuclear missiles by the U.S. and USSR, a nuclear war initiated by military men risking all to save their vulnerable nuclear armaments is a possibility. U.S. radar and computer warning systems regularly produce false warnings of Soviet nuclear attacks; in a crisis, a false warning might be regarded as a real one, and we might unintentionally fall into the nuclear abyss. "Nuclear cataclysm is likely to be the result of impulsive, panicked reactions on the parts of a very small number of individuals" (Vash, 1986). Some see it to be of vital importance to negotiate an agreement to dismantle most of the nuclear devices and delivery systems--particularly the so-called "first-strike" devices including the MX missile and the Soviet equivalents--thus re-stabilizing the nuclear stand-off between the superpowers (Ford, 4/8/1985:87).

In this research project, the investigators make no pretense of neutrality. We do not stand neutral with respect to the possibility of a nuclear holocaust, which would be horrendous beyond anything that has touched the earth since the Black Plague. The goal is the avoidance of nuclear war. Feshbach and his associates (1986) state that social scientists "have special responsibilities and a special role in regard to social advocacy." The sociologist on this team, (Zippin), believes we should work toward total unilateral or bilateral nuclear disarmament. In contrast, the psychologist on this team, (Kierulff), currently believes that the superpowers would be better off maintaining deterrent nuclear forces with a total megatonnage below the threshold that would bring on a nuclear winter. Several of the arguments behind the deterrence position

have been well-stated by Clemens (1986): "Have not nuclear arms helped prevent major wars since Hiroshima--between the superpowers and between them and China? Might we not face a heightened danger of war if all nuclear arms disappeared? And what if one side cheated and cached, say, 100 nuclear bombs? Could it not blackmail others? In view of such problems, it may be more realistic to permit each nuclear power to retain an umbrella of several hundred atomic weapons until all parties feel deterrence is unnecessary."

Regardless of whether minimal deterrence, total nuclear disarmament or some other path offers the safest way out of the current dilemma, the threat of mass destruction is not the only reason to be wary of the proliferation of nuclear devices and delivery systems. The U.S. pays for building 3 or 4 more nuclear warheads every day. "The behavior of deploying ever more sophisticated weapons that can destroy an opponent who dares make a first strike" (Nevin, 1986) involves the United States spending billions of dollars annually at a time when federal budget deficits threaten to bury our economy in a tide of red ink. Human services are being cut back to provide money for more nuclear missiles and for research into space-based defenses against Soviet missiles. (Former secretary of state Alexander Haig (1986) characterized the Strategic Defense Initiative as an "economic boondoggle.") Another lamentable consequence of the current situation is that the expectation of a nuclear holocaust has negative effects on the developing psyches of children and adolescents as well as making life more anxious for the adult population (Beardslee, 1982; Escalona, 1982; Schwebel, 1982).

For these reasons, and perhaps others, it would be desirable for the superpowers to take steps to end the nuclear arms race. Author and former editor of the Saturday Review Norman Cousins concludes, "I see no way of changing government policy in the arms race except through a profound change of public opinion (1986)."

There is reason to expect that substantial portions of the U.S. public may have knowledge deficits regarding nuclear issues. On the one hand, such deficiences may result from selective avoidance of new information; on the other hand, inadequacies in available educational programs may contribute. Burns and Aspelaugh (1984) conceive exposure to new information about nuclear war as a process of acculturation which may be resisted as incongruent with an individual's values, noting that current educational programs generally indoctrinate values supporting existing military policy. Mack (1984, 1985) also notes that maintaining inadequate nuclear education programs may serve to insulate irrational policies from criticism. Zweigenhaft (1985), perceiving the need for improved nuclear education, has studied the relative effectiveness of several interventions upon knowledge of nuclear issues.

A survey by Zweigenhaft (1983) revealed a general deficit in level of information about nuclear weapons and their history. Particularly acute deficiencies of information were found for knowing the realities of a nuclear attack. Similarly, Yankelovich (1984) observed that an overwhelming majority of the U.S. public do not know America's policy of reserving the option to use nuclear weapons first.

Mack (1985 [2]) discusses emotional, cognitive and institutional determinants of irrational thinking about nuclear war, pointing out that

distortions of nuclear knowledge may reflect both personal and institutional resistances. In the same report, Mack cites a survey demonstrating a positive association between knowledge about nuclear weapons and the resistance to nuclear war. Fiske, et al (1983) found that when images of nuclear war are made more concrete through more detailed information, there was correspondingly more motivation toward becoming engaged in anti-nuclear activity. Analogously, Tyler and McGraw (1983) found that when respondents were misinformed about the limited survivability of a nuclear war, they were less likely to engage in behavior directed toward preventing a nuclear confrontation.

THE SURVEY

This research project explored public opinion with respect to nuclear issues, particularly the relationship between attitudes, beliefs, and knowledge. The purpose of the study was to "correlate sophistication regarding nuclear matters with opinion on the issues..." (Kramer, Kalick & Milburn, 1983:24). We explored the nature of the relationships between knowledge (e.g., "How many nations have nuclear weapons now?"), attitudes (e.g., "I think it would be a good thing for the U.S. and the Soviet Union to agree to a mutual nuclear freeze."), and beliefs (e.g., "Is it more likely that a major nuclear war would start due to appeasement, where one side appears weak to the other, or due to escalation, where each side builds more weapons for defense and the other side is frightened into thinking that its enemy's defensive actions are really hostile aggressive actions?" [This last item and several others were included according to suggestions by Tetlock, 1983]).

Two opposing principles were theorized to be involved in the calculation of national security by our respondents. One was that the more weapons a nation has the more powerful and secure it will be. The other point of view was that more missiles and more nuclear devices bring <u>less</u> security rather than more security because of the increased danger of accidental launches, the damage to the domestic economy involved in producing "goods" which are designed never to be used, and the possibility that nuclear arms escalation may lead to a climate of tense suspicion that would increase the likelihood of global war.

What are the characteristics of people who adhere to these two different points of view? Are there systematic differences with respect to the demographics of the two groups in terms of age, gender, ethnicity, income, education, political party affiliation, or military experience? This survey provided some tentative answers to these and other related questions.

METHODS

Subjects

A study of registered voters in Los Angeles County was undertaken in the Spring of 1985. It was decided that rather than all of the residents of the County, registered voters would be the most appropriate population for this study, since registered voters have already indicated their willingness to participate in the political process to some degree--a variable that is of the essence with respect to the main issues in this

research. The sampling procedure closely approximated a random sample (Downie & Heath, 1983: 135.) On May 30, 1985, a 53-item questionnaire was mailed to 750 registered voters. The self-selection process (in other words, the process whereby some people chose to respond to our mailed questionnaire while others did not) generated a sample which is likely to represent an active sector of the voting public in that our subjects were sufficiently motivated both to register to vote and to respond to a mailed survey on nuclear issues in the absence of a significant extrinsic incentive. (One dollar was offered to each respondent, but fewer than 10 people requested the remuneration.) Therefore, we can assert that the obtained results are particularly relevant since our sampling procedure was aimed at the most interested and active registered voters and it is the most active citizens who are likely to influence policy decisions through the candidates they support and influence. The sample we obtained is worthy of attention insofar as it may represent a particularly influential portion of the public.

The demographic characteristics of the obtained sample (eliminating missing data) were as follows: 64% of the respondents were male; 53% were married; 31% had prior military service; 68% attended college or obtained a college degree while 24% had only graduated from high school; 54% had an annual family income from 20 to 50 thousand dollars and 15% had a family income above 50 thousand dollars; 82% were Caucasian. With respect to the issue of how our sample differed in political preference from the proportions of Republicans and Democrats in the County, a tally from the Registrar of Voters showed 3,519,395 registered voters, of whom 2,005,280 were Democrats and 1,190,408 Republicans, an approximately two-to-one

ratio; our respondents, on the other hand, were almost evenly divided between the two major parties--41% are Republicans and 40% are Democrats--with 15% politically unaffiliated. (The County Registrar of Voters does not compile information as to demographic characteristics other than gender and party affiliation.)

Procedure

Respondents answered 14 items on a Likert scale "Opinion Poll" in the questionnaire which measured attitudes regarding nuclear weapons including support or opposition with respect to a mutual nuclear freeze, a unilateral nuclear freeze, total bilateral nuclear disarmament, the sufficiency of a minimum nuclear force, the Strategic Defense Initiative (Star Wars), the controversial MX missile, and the question of whether or not the U.S. ought to build more missiles for the sake of possible psychological or political advantage. (Tyler & McGraw, 1983, and The Public Agenda Foundation, 1984, influenced the choice of opinion questions.) To control for yea- or nay-saying bias, equal numbers of positively and negatively worded statements were included in the Opinion Poll. A 23-item "Nuclear Quiz" was next in the questionnaire. True/false/not-sure quiz items were balanced as to numbers of true and false items, and multiple choice items were balanced as to numbers of (a), (b), (c), (d), or (e) answers. Finally, 11 demographic characteristics and five beliefs were recorded. (The opinion and knowledge sections were refined through item analyses of preliminary versions of the questionnaire which were administered to student populations.)

Data analyses included determining correlations between knowledge, attitudes, beliefs and demographics, and testing for curvilinearity of the relationship between knowledge and attitudes.

We utilized statistical procedures appropriate for interval data. Abelson and Tukey (1970) argue that proper assignment of numeric values to the categories of an ordered metric scale will allow it to be treated as though it were measured at the interval level. Labovitz (1970, 1972) goes further, arguing that, except for extreme cases, interval statistics can be applied to any ordinal level variable. Although some small error may accompany the treatment of ordinal variables as interval, this is offset by the use of more powerful, more sensitive, more readily interpreted statistics with known sampling error. The application of interval statistics to ordinal data is particularly appropriate where, as in the present study, the research was exploratory or heuristic in nature. Furthermore, in this investigation, the need for statistical control of potentially confounding demographic variables (age, education, income) was imperative. In view of the survey sample obtained, the most readily available and applicable method for the statistical control of additional variables, permitting utilization of all respondents, was partial correlation. Contingency analysis, typically utilized to control for confounding factors in surveys where the sample size is more robust, would have resulted in prohibitive reductions in the sizes of the subsamples with which hypothesized associations were tested. The technique of partial correlation is not simpler or less sophisticated than some supposed "full" correlation; rather, partial correlation coefficients reflect the relationship between two variables when other confounding variables are mathematically eliminated or "partialed out" (Downie & Heath, 1983.)

Tests of significance were one-tailed in the case of directional hypotheses, and two-tailed for non-directional hypotheses, with the level of significance set at .05. (For the sake of simplicity all probability levels have been reported as two-tailed, except where noted.)

Using Cronbach's alpha to ascertain the homogeneity among knowledge items and opinion items led to the selection of several scales. The INFO scale ("Information," alpha = .73) consisted of 22 knowledge items from the Nuclear Quiz. The seven-item YEA scale ("Yes, Enough, Already"; alpha = .73) reflected the attitude that we already have enough--or more than enough--nuclear devices. Respondents scoring higher on the YEA scale were generally (a) in favor of a nuclear freeze, (b) satisfied with a minimum force of nuclear missiles, (c) opposed to building more MX missiles, and (d) against building more missiles for psychological or political reasons. In contrast, the 13-item BOMB scale (r = .88) reflected the opposite of the YEA scale: (a) opposition to a nuclear freeze, (b) a desire to have as many or more missiles than the Soviets and dissatisfaction with a minimum force, (c) support for the MX missile, (d) willingness to build more missiles for psychological or political advantage, and, in addition to the preceding items, (which were the opposite of YEA attitudes), (e) opposition to total bilateral disarmament, (f) opposition to a unilateral nuclear freeze, and (g) willingness to fund research on the Strategic Defense Initiative (Star Wars). In sum, then, the YEA scale is best described by recalling the origin of the acronym: "Yes, Enough, Already"--no more nuclear devices; the YEA scale does not include any items related to a unilateral freeze or to total bilateral disarmament or to Star Wars research. The BOMB scale, on the other hand, represents the opinion that building more nuclear bombs and

missiles will lead to a stronger defense. A person scoring low on the BOMB scale would be one who scored high on the YEA scale and also tended to favor a unilateral freeze and total bilateral disarmament, and opposed funding Star Wars research.

Given that the internal consistencies of each of the three main scales were in excess of .70, (in addition to satisfactory split-half indices) we were able to employ two reliable opinion scales (YEA & BOMB) and a reliable knowledge scale (INFO) in testing our hypotheses.

Hypotheses

1. Higher scores on INFO (higher scores on the Nuclear Quiz) will correlate positively with more receptivity toward a mutual or unilateral freeze, toward a minimum nuclear force, and toward rejection of the MX (reflected in higher totals on the YEA scale) and, in addition, more receptivity toward bilateral disarmament, and rejection of Star Wars (reflected in lower totals on the BOMB scale). In other words, the more a voter knows about the issues, the more he or she will tend to favor the "Yes, Enough, Already" set of attitudes.

2. Demographic variables (age, income, marital status, number of children, military service, gender, political party preference) will correlate significantly with a) INFO, b) attitudes (YEA or BOMB) and c) beliefs.

3. Knowledge regarding (a) how quickly nuclear devices can be built, and (b) how many nations already have nuclear devices will correlate positively with opposition toward total bilateral nuclear disarmament. In

other words, if a voter realizes that nuclear devices can be built rather quickly and that 5 or 6 or more nations now possess nuclear devices, that voter will tend to oppose total bilateral nuclear disarmament.

RESULTS

Attitudes

85% agreed that a mutual nuclear freeze would be a good thing. (Mutual nuclear freeze was defined as follows: "If BOTH the U.S. and the Soviet Union stopped testing, producing, or deploying nuclear weapons ['atom bombs'] and missiles that carry nuclear weapons, it would be a 'mutual nuclear freeze.')

Only 11% were against a mutual nuclear freeze.

48% thought that "it would be an acceptable risk for the U.S. to declare a six month freeze on building nuclear weapons to see if the Soviets would do the same." 42% disagreed, while 8% were neutral. (Totals of many items do not add to 100% because of subjects who did not respond to that particular item, ranging from 1% to 3% of the total.)

50% disagreed with "I think we can avoid nuclear war by having a minimum force of nuclear weapons. We need just enough to wipe out the Soviet cities if they tried to attack us first." (39% agreed; 10% were neutral.)

46% thought that it is unnecessary for the U.S. to "have at least as many nuclear weapons as the Soviets"; 43% thought it is necessary.

82% thought that "the U.S. and the Soviets ought to get rid of all their nuclear weapons." 27% thought that it was a bad idea.

62% thought that "spending money for research on the 'Star Wars' plan ... is a good idea," 6% were not sure, while 24% disagreed.

When the Star Wars issue was worded negatively ("Some experts believe that a leak-proof defense against incoming Soviet missiles is impossible. I think we should not spend any money for research on the 'Star Wars' plan.") 26% agreed, 15% were neutral, and 58% disagreed.

Only 31% approved of funding more MX missiles; 50% did not approve.

46% agreed that "MX nuclear missiles have made the world more dangerous and less secure...," while 22% were neutral and 23% disagreed.

54% agreed with the following: "The Soviets and their allies have more military forces in Europe. I think the U.S. and our NATO allies should have at least as many nuclear weapons, and at least as many types of missiles as the Soviets do, so Western European nations do not feel overpowered by the Soviets." 31% disagreed and 14% were neutral.

63% thought that "if we don't really have a military need for more or newer types of missiles we shouldn't build them just to try to get a psychological or political advantage out of it," while 29% disagreed.

Knowledge

71% knew that "the temperature created by a nuclear explosion is hot enough to melt steel," while 10% thought the statement was false and 18% were not sure. (Smoke, 1985, pointed out that this question would always be true of a thermonuclear explosion, but not always true of a nuclear explosion.)

90% correctly identified menningitis as something which "would NOT be one of the possible effects of radiation from a nuclear explosion," while others incorrectly believed that burns (1%), radiation sickness (1%), cancer, leukemia, or tumors (2%), genetic defects in children born to people exposed to radiation (1%), or death (1%) could NOT be caused by radiation.

When asked "How many nations have nuclear weapons now?" 3% responded that 2 nations did, 5% thought 3 nations did, 9% believed 4 nations did, 13% checked "5 nations," and 64% marked "6 or more nations." We counted both 5 and "6 or more" nations as correct inasmuch is there is general agreement about the U.S., USSR, Britain, France, and China having thermonuclear devices, but some uncertainty about whether Pakistan, India, Israel, and/or South Africa may currently possess them.

43% correctly answered that the U.S. Air Force has planned how to go about attacking the USSR first with nuclear devices (Ford, 4/8/1985, pp. 49, 53, & 63) while 45% were not sure, and 11% thought it was not true.

We asked, "What word is used to describe a new weapon or weapons system which leads to the following? -- The U.S. or the Soviet Union believes it can greatly improve its situation by attacking first in a crisis." Only 22% correctly answered "destabilizing," while a plurality (29%) marked "deterrent," 17% said "preponderant," and 24% opted for "launch-on-warning."

44% were not sure whether "Federal money spent building missiles creates more jobs than the same amount of money spent for education, housing, or transportation." 39% correctly answered "false," while 16% thought it was true.

21% knew that the greatest amount of radioactive waste in the U.S. is produced by the military (Knickerbocker, 1984) while 49% thought it was the civilian-commercial sector which was responsible, and 29% were not sure.

50% knew that the U.S. computer warning systems have malfunctioned and sent signals suggesting that the Soviets had fired missiles at the U.S. (Ford, 1985:71) while 8% thought the statement was false and 41% were not sure.

73% knew that "If all our land-based missiles were destroyed...we would have [a] way of retaliating against the Soviets." 18% were not sure, and 8% got it wrong, apparently not knowing or remembering about the other two legs of our nuclear triad--bombers and submarines.

77% got this item right by checking "launch on warning." "Because of the 'use them or lose them' factor in nuclear war, some military experts propose sending off missiles upon being informed by radar or spy satellites that enemy missiles are on the way. This would be called:"... 11% opted for the distractor "pre-emptive strike," 2% checked "inoperative mission," and 8% marked "destabilizing effect."

When asked "how many nuclear weapons are there in the world now?" 40% correctly checked 50,000; 19% marked a mere 5,000; 1% unrealistically filled in 500; 12% marked 500,000; and 13% checked a remarkable 5,000,000.

When asked, "Where does the U.S. have more nuclear weapons: on land-based missiles, or aboard nuclear submarines?" the greatest number of our respondents (47%) incorrectly checked "land," while the correct answer (checked by 18%) was "submarines." 33% were not sure.

Only 13% knew that it would take the missiles from only one Poseidon submarine to destroy every large and medium-sized city in the USSR (United Nations Association of the U.S.A., et al., undated) while the vast majority thought it would take 5, 25, 50 or 100 Poseidons.

The majority (50%) knew that, "If the US. were to be destroyed by a Soviet nuclear attack, U.S. submarines could decide, on their own, to send off nuclear weapons against the Soviets." 10% thought the statement was false, and 37% were not sure.

An even larger majority (67%) knew that the following statement was false: "U.S. submarines...usually travel on the surface...and would be fairly easy for the Soviets to find and destroy." Only 3% thought it was true, while 27% were not sure.

64% correctly identified this item as false: "Let's say the nations of the world agree to take apart all nuclear bombs, and can prove it. It would take so long to make a nuclear bomb from scratch that any war would be over before a nation could build one." 28% were not sure about it, and 6% incorrectly thought it to be true.

When asked, "Do you know how the 'Star Wars' strategic defense is supposed to work?" 49% of our respondents checked "Yes," 18% checked "No," and 30% admitted they were not sure.

"If the 'Star Wars' strategic defense were able to remove 98 out of 100 Russian missiles sent at the U.S., how many Americans would still die in such a nuclear attack?" 36% correctly answered 26 million, while 24% marked 2.6 million, 9% marked 260 thousand, 9% checked 260 million, and 4% marked an overly-optimistic 26 thousand.

The majority (52%) knew what a cruise missile is: "A small, unmanned airplane that can fly low, not being seen by enemy radar. It can carry either nuclear or regular warheads. It can be launched from airplanes, trucks, ships, or submarines." 8% thought the description applied to the B1 bomber, 4% figured it was the Pershing missile, and 26% believed it fit the Midgetman missile.

75% correctly identified nuclear winter as the pair of words which fits this description: "...the explosion of more than about 500 to 1000 nuclear weapons would block out the sunlight and lower temperatures by as much as 45 degrees in the Northern Hemisphere ... due to the dirt, dust and debris that would be trapped in the atmosphere." (Editorial, Los Angeles Times, 12/13/84.) 8% went for "cold phase," 10% opted for "global freeze," and 5% checked "dust bowl." Nobody responded to the distractor "polar age."

65% correctly picked ozone layer to fill in this sentence: "...all life except for grass and insects would be ended after a major nuclear war because of a decrease in the atmospheric _____ _____." (Editorial, Los Angeles Times, 12/13/84; Schell, 1982.) 12% check "ionization layer," 6% thought "tropospheric layer" was the answer, 5% marked "beta layer," and 1% checked "metazone layer."

A majority--56%--correctly identified ultraviolet rays as what the ozone layer protects us from. 18% thought it was cosmic rays, 6% checked beta rays, and 8% marked gamma rays, but nobody thought it was alpha rays.

Beliefs

Many of our respondents apparently felt nuclear escalation is more dangerous than appeasement. When presented with the following item: "Is it more likely that a major nuclear war would start due to appeasement, where

one side appears weak to the other, or due to escalation, where each side builds more weapons for defense and the other side is frightened into thinking that its enemy's defensive actions are really hostile, aggressive actions?" 40% checked escalation, 29% marked appeasement, and 29% were not sure.

When the issue of an agreement between the superpowers was raised, 44% thought the U.S. could be trusted to stick to a mutual nuclear freeze (19% distrusted the U.S. and 36% were not sure), while only 16% felt the USSR could be trusted (51% were mistrustful and 31% were not sure).

Notwithstanding the general distrust of the USSR expressed in the above items, 72% indicated they "would be willing to permit the USSR on-site inspection...if the USSR agreed to allow the U.S. on-site inspection to check on Soviet compliance with a nuclear freeze." (Seeing is trusting, apparently. 5% checked "No," and 19% were not sure. [While this item would be more accurately classified as an attitude item, it is reported in this section because of its relationship to the above belief items.]

The vast majority, 82%, did not expect to "survive a nuclear war." 4% apparently thought they could survive such a war, while 11% were "neutral" on the question.

Basic Statistics on the YEA Attitude Scale

For the 7-item YEA scale, which was based on a 5-point Likert scale (disagree = 5, disagree somewhat = 4, neutral = 3, agree somewhat = 2, agree = 1) the mean was 16.94, the median was 16.90, and the standard deviation was 6.45. The range of raw scores was from a low of 7 to a high

of 35. In reporting the correlations with other scales, the YEA and BOMB scales were reversed so that the higher numbers indicated agreement with YEA attitudes, in order to accord with the common sense or lay interpretation of the correlations--in other words, in the following sections, a "high YEA" will indicate agreement with the "Yes, Enough, Already" attitude, and a "high BOMB" will indicate support for nuclear escalation.

Relationship Between Knowledge and Attitudes

A series of correlations were computed between knowledge related to nuclear issues (INFO) and attitude scales operationalizing opposition or support regarding building more nuclear weapons (YEA & BOMB). In order to deal with the potentially confounding effects of age, education and income, the latter variables were held constant. (When any of those three variables themselves were involved in a correlation, the other two were held constant.)

As hypothesized, the association between the knowledge scale (INFO) and the scale which reflects respondent's attitudes of support for nuclear escalation, the BOMB scale, was negative (table 2). For respondents with no missing data, $r = -.34$, $p < .004$, $n = 57$, while for all cases, we observe $r = -.21$, $p < .02$, $n = 90$. In other words, those who favor funding Star Wars research and building more missiles while opposing the nuclear freeze proposal and nuclear disarmament show a tendency to exhibit less knowledge as measured by the nuclear quiz than those who hold the opposite attitudes. Similarly, the correlation between the 22-item knowledge scale

(INFO) and the summary scale reflecting the opinion that we already have enough nuclear devices (YEA) was positive and statistically significant (r = .22, p < .02, n = 70) for a subsample of subjects who completed every knowledge scale item and every opinion scale item; the correlation was lower for all cases, but also significant in the predicted direction (r = .16, p < .03, one-tailed, n = 90). The analysis of the relationship between knowledge and attitudes supported the hypothesis that, in general, individuals who are better informed about nuclear matters show a tendency to manifest somewhat greater opposition to nuclear escalation than individuals who are less well informed.

We found no significant degree of curvilinearity in the relationship between attitudes and knowledge.

As hypothesized, one of the associations between individual knowledge items and individual attitudes was statistically significant. Subjects who realize that nuclear devices can be built quite rapidly are less likely to support a policy of total bilateral nuclear disarmament (r = .18, p < .04, n = 96). ("Let's say the nations of the world agree to take apart all nuclear bombs, and can prove it. It would take so long to make a nuclear bomb from scratch that any war would be over before a nation could build one. True or false?" The correct answer is "false". Those who got the item right show a tendency to agree with this opinion: "I think the proposal that the U.S. and the U.S.S.R. should get rid of all their nuclear weapons is a bad idea" and to disagree with the opposite opinion: "I think the U.S. and the Soviets ought to get rid of all their nuclear weapons.")

Relationship Between Demographics and Attitudes

The greatest association was between political party affiliation and opposition to escalation. Voters who considered themselves Democrats

were somewhat more likely than Republicans to oppose escalation as measured by the BOMB scale: $r = .37$, $p < .001$, $n = 67$. The second highest correlate was age, with younger voters being more opposed to escalation: $r = .20$, $p < .02$, $n = 91$.

The relationships between Information, Demographics and Attitudes are shown in tables 1 and 2.

Table 1

Correlates of Information and Demographics with YEA Scale

Variable	Partial Correlation	n	Significance
22-INFO	.16	90	$p < .03$* 1-tail
Sex (male)	.04	90	$p < .31$
Age	-.14	91	$p < .09$
Education	-.01	91	$p < .44$
Income	.03	91	$p < .33$
Military Service	.14	47 (males only)	$p < .16$
Political Preference (Democratic)	.29	67	$p < .006$**
(Only Cases with No Missing Data: Complete Scales)			
22-INFO	.22	70	$p < .02$*
11-INFO	.29	59	$p < .01$*

*$p < .05$. **$p < .01$. All tests of significance are 2-tailed unless noted.

Table 2

Correlates of Information and Demographics with BOMB Scale

Scale	Partial Correlation	n	Significance
22-INFO	-.21	90	$p < .02$*
Sex (male)	-.08	90	$p < .20$
Age	.20	91	$p < .02$*
Education	-.01	91	$p < .45$
Income	-.04	91	$p < .34$
Military Service	.14	47 (males only)	$p < .16$
Political Preference (Democratic)	-.37	67	$p < .001$***
(Only Cases with No Missing Data: Complete Scales)			
22-INFO	-.34	70	$p < .004$**
11-INFO	-.27	59	$p < .01$**

*$p < .05$. **$p < .01$. ***$p < .001$ All tests two-tailed.

Relationship Between Demographics and Nuclear Knowledge

In varying degrees, gender, income and political party preference were associated with nuclear knowledge. Being male was correlated somewhat with higher levels of information ($r = .36$, $p = .000$, $n = 90$). Income was associated with nuclear knowledge--the higher the income, the more knowledge ($r = .25$, $p < .006$, $n = 91$)--while education was not significantly associated. Political preference was associated with nuclear

knowledge (r = .24, p < .02, n = 67), with Democrats showing higher levels of information.

Results are shown in table 3.

Table 3

Correlations Between Demographics and Information

Variable	Partial Correlation	n	Significance
Sex (male)	.36	90	p = .000***
Age	-.06	91	p < .28
Education	.12	91	p < .12
Income	.25	91	p < .006**
Military Service	-.02	47 (males only)	p < .43
Political Preference (Democratic)	.24	67	p < .02*

*p < .05. **p < .01. ***p < .001 All tests two-tailed.

Relationship Between Beliefs, Knowledge and Attitudes

As would be expected from the nature of the underlying attitudes, those who believed that escalation is more dangerous than appeasement tended to support the nuclear freeze and oppose building more missiles (YEA scale, r = .55, p < .000, n = 61), while those who believe that appeasement is more dangerous than escalation tend to favor building more nuclear devices and missiles (BOMB scale, r = -.60, p = .000, n = 61).

This pattern was repeated for beliefs regarding the chance of personal survival in a nuclear attack, although the magnitude and statistical significance of the observed associations were much more modest. Those who believed they could survive a nuclear attack showed a tendency to support adding to our nuclear arsenal (higher on BOMB scale, $r = -.25$, $p < .008$, $n = 87$), while those who figured they would not survive tended to favor the nuclear freeze (higher on YEA scale, $r = .19$, $p < .03$, $n = 87$).

In both analyses we find that Information was not a particularly strong correlate of these beliefs, although there was a slight but statistically significant association between believing that one would not survive a nuclear attack and a higher degree of knowledge on a short version of the nuclear knowledge scale (11-item INFO, $r = .18$, $p < .04$, $n = 87$).

Relationship Between Demographics and Beliefs

It is of interest that Democrats tended to believe that escalation would be more likely than appeasement to lead to nuclear war ($r = .29$, $p < .01$, $n = 50$). As compared with Republicans, Democrats also showed a tendency to believe that they would not survive a nuclear attack ($r = .33$, $p < .002$, $n = 72$).

Among males, prior military service was associated with the belief that appeasement rather than escalation would increase the chances of nuclear war ($r = -.29$, $p < .03$, $n = 37$).

These results are shown in tables 4 and 5.

Table 4

Correlations Between Demographics and Appeasement vs. Escalation Belief

Variable	Partial Correlation	n	Significance
Sex (male)	.05	65	$p < .32$
Age	-.17	66	$p < .07$
Education	.15	66	$p < .43$
Income	.02	66	$p < .43$
Military Service	-.29	37 (males only)	$p < .03$*
Political Preference (Democratic)	.29	50	$p < .01$**

*$p < .05$. **$p < .01$. All tests of significance are two-tailed.

Table 5

Correlations Between Demographics and Survival Belief

Variable	Partial Correlation	n	Significance
Sex (male)	.08	94	$p < .19$
Age	-.01	95	$p < .43$
Education	.05	95	$p < .29$
Income	.03	95	$p < .37$
Military Service	.05	46 (males only)	$p < .34$
Political Preference (Democratic)	.33	72	$p < .002$**

*$p < .05$. **$p < .01$. All tests of significance are two-tailed.

DISCUSSION

In our analyses, we have obtained evidence which suggests that voters with more knowledge about nuclear issues show a statistically significant tendency to score higher on the YEA attitude scale ("Yes, Enough, Already"), reflecting the opinion that the U.S. does not need any more nuclear devices. One possible implication is that education about nuclear matters may modify voters' attitudes towards nuclear issues in the direction of pro-freeze, anti-escalation opinions, but caution with respect to this inference is necessary, however, since we are dealing with a correlational analysis, and correlations cannot prove causation. An alternative hypothesis is that holding strong pro-freeze, anti-escalation attitudes motivates people to seek further knowledge, rather than that having more knowledge leads people to oppose nuclear escalation. Of course, both causal directions could be (and probably are) intermingling to produce the results shown in this survey. Notwithstanding the causation issue, however, the single most important finding in this research is that there is a tendency for the more knowledgable voters in this survey to favor the nuclear freeze and oppose building more missiles. Other researchers have discovered similar correlations (Feshbach, et al, 1986). The Democrats in our survey demonstrated both higher levels of knowledge and more opposition to nuclear escalation than did the Republicans. The fact that the males showed more knowledge than females may reflect differential socialization of males with respect to technological aspects of military matters--a number of the information items are rather technical

and deal with the military aspects of nuclear delivery systems. It is of interest that income was significantly associated with nuclear information while education was not. We speculate that this finding suggests that in more affluent subgroups there may be more discussion related to nuclear issues.

The small correlation coefficients between knowledge and attitudes obtained in this survey may represent the vast confusion many or most people feel with respect to nuclear issues; there is a great deal of misinformation and confusion--a sense of being overwhelmed by all the facts and the opinions and the horrible emotions that the images of nuclear war entail.

A vast majority of our respondents (78% to 85%) favored the nuclear freeze proposal, a finding which accords with other surveys which have generally shown upwards of 75% approval for the freeze. Our respondents, however, differed from those in other surveys in that they supported research on Star Wars by a margin of about 60% to 25%. A recent Los Angeles Times national telephone poll (N = 1847) found that "the public rejects Star Wars--fifty-five percent say they would ban any such research to avoid nuclear weapons escalation. Only one-third agree that the research should go ahead..." (Treadwell, 1985). It is of particular interest that the majority in this survey, while much more supportive of Star Wars than other surveys have shown, also overwhelmingly supported the nuclear freeze. It is worth noting that Republicans were significantly over-represented in our sample compared to their proportions among registered voters in Los Angeles County. We were able to demonstrate that Republicans tend toward supporting a more aggressive nuclear policy than

Democrats; therefore the observed support for Star Wars may, at least in part, be due to the disproportionate representation of Republicans in this sample.

With respect to the positive correlation between knowing that nuclear devices can be built rather quickly, and opposition to <u>total</u> bilateral nuclear disarmament, the crux of the issue may rest with the word "total." If the U.S. and the U.S.S.R. dismantle <u>all</u> their nuclear devices and a conventional war between the superpowers subsequently occurs, each side would naturally begin building nuclear devices and the first nation to build enough to devastate the opposing side would have a strong incentive to use them. The perspective here may be that having a minimum number of nuclear devices deployed would probably be safer than having none at all. The knowledge of how to build nuclear devices cannot be dismantled along with the bombs themselves. Our survey suggests that the more knowledgable voters tend to think that we should not build any more thermonuclear devices, and those who know how quickly nuclear devices can be built tend to feel it would be foolish to dismantle all of them.

After reading a preliminary report of the results of this survey, the research director at the Center for Foreign Policy Development (Smoke, 1985) offered his perspectives on several of our knowledge items. With regard to the question about the temperature created by a nuclear explosion being hot enough to melt steel, he noted that "to be exact, it depends on the yield. If you (specified) <u>thermo</u>nuclear the true answer would always be true." With regard to the question of where the U.S. has more nuclear weapons, on land-based missiles, or aboard nuclear submarines, Smoke wrote: "If by 'weapons' you mean warheads, there is no possible doubt--many more

on subs." His most interesting response concerned our question, "Do you know how the 'Star Wars' strategic defense is supposed to work?" When we noted that "Yes" was considered the right answer for purposes of this survey, Smoke asked, "Why? Even the advocates (of the SDI) don't (know). No decision has been made yet and won't be for a while." (In retrospect, the decision to include that particular question in our knowledge scale was misguided, and may have contributed to the error variance in our findings.)

Some of the knowledge items were selected with the hope that they would correlate with the opinion items in the direction predicted. For example, "Federal money spent building missiles creates more jobs than the same amount of money spent for education, housing, or transportation. a) True b) False c) Not sure." The correct answer is "false." It would seem that simply knowing this fact would tend, all other things being equal (which they never are... but if they were) to incline one towards an anti-escalation position. It is possible that one could select a set of "facts" which would correlate with attitudes opposite to the findings of this survey. For instance, one such knowledge item might be: "The U.S. relies on its nuclear forces to balance out the more extensive Soviet and Warsaw Pact military presence in Europe; without a convincing nuclear threat, U.S. taxpayers would have to spend considerably more to match Eastern bloc conventional forces. True or false?" The answer would be considered to be "true," and a knowledge scale constructed of such items might correlate with support for nuclear escalation, building more MX missiles, funding Star Wars, opposition to the freeze, and so forth. The point here is that knowledge in the political arena may be said to consist of some portion of fact and some portion of bias. What one person may consider fact another

considers propaganda. Several volunteers--conservatives and liberals--read through initial versions of the questionnaire culling out knowledge items which seemed to them to be slanted, and recommending the rewording of attitude items so as to eliminate or minimize bias. An example of one of the suggestions which was made too late to include in the questionnaire is the following: in this item--"If we don't really have a need for more or newer types of missiles we shouldn't build them just to try to get a psychological or political advantage out of it"--the inclusion of the word really may tend to elicit a "knee-jerk" positive response, whereas the same sentence without the really might elicit fewer positive responses. (The same criticism might be leveled at the inclusion of the word just in the same item.) The U.S. public exhibits considerable confusion on nuclear issues and will sometimes contradict itself, depending on the way particular questions are worded (The Public Agenda Foundation, 1984).

Suggestions for Future Research

Since many more of the relationships might prove significant with a larger N, it would be valuable to replicate the study with a larger, stratified national sample. The modest correlations obtained may represent a situation in which those who volunteered to fill in the questionnaire were those who knew most about the issues, thereby producing a sample which underestimates the degree of correlation between knowledge and attitudes in the broader population. If a stratified sample succeeded in getting respondents from among the moderately- and least-knowledgeable levels of society, correlations between knowledge and attitudes which are substantially more robust may be revealed.

A recent analysis detailed four different assumptions regarding the usefulness of nuclear devices: (1) no use, (2) only one use (deterrence), (3) dual use (deterrence and use against enemy if interests threatened by conventional war), and (4) multiple use (in addition to both dual uses, inhibit USSR, and if nuclear war occurs, prevail) (Public Agenda Foundation, 1984:50-69). Future research along these lines should include these assumptions as variables.

Further studies of the relationship between knowledge, beliefs, and attitudes in this vital area should include experimental manipulation of knowledge, beliefs and assumptions to observe the nature of the causal influence on resultant attitudes.

SUMMARY

A survey of registered voters in Los Angeles County found that those with more accurate knowledge about nuclear issues (as measured by a nuclear quiz) showed a statistically significant tendency to be of the opinion that the U.S. already has enough nuclear devices and should not spend money building more. As compared with Republicans, Democrats in our sample tended to have more accurate knowledge, oppose nuclear escalation, believe that they would not survive a nuclear attack, and believe that escalation is more dangerous than appeasement.

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